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NASA Procedural Requirements

COMPLIANCE IS MANDATORY

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[Request Notification of Change](#) (NASA Only)

Subject: Release of NASA Software

Responsible Office: Office of the Chief Technologist

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Appendix E. Software Technology Readiness Levels (as defined in Appendix J, NPR 7120.8).

E.1 TRL 1 Basic Principles observed and reported. In particular, regarding software, TRL 1 indicates scientific knowledge generated underpinning basic properties of software architecture and mathematical formulation.

E . 2 TRL 2 Technology concept and/or application formulated. In particular, regarding software, TRL 2 is the point at which invention begins, practical application is identified but is speculative, no experimental proof or detailed analysis is available to support the conjecture, and underlying algorithms are clarified and documented.

E.3 TRL 3 Analytical and experimental critical function and/or characteristic proof-of-concept. In particular, regarding software, TRL 3 indicates development of limited functionality to validate critical properties and predictions using non-integrated software components.

E.4 TRL 4 Component and/or breadboard validation in laboratory environment. In particular, regarding software, TRL 4 indicates key, functionally critical, software components are integrated, and functionally validated, to establish interoperability and begin architecture development. Relevant Environments and performance in this environment predicted.

E.5 TRL 5 Component and/or breadboard validation in relevant environment. In particular, regarding software, TRL 5 indicates End to End Software elements implemented and interfaced with existing systems conforming to target environment, including the target software environment End to End Software System, tested in relevant environment, meets predicted performance; operational environment

performance predicted.

E.6 TRL 6 System/subsystem model or prototype demonstration in a relevant environment (ground or space). In particular, regarding software, TRL 6 indicates prototype software partially integrated with existing hardware/software systems and demonstrated on full-scale realistic problems.

E.7 TRL 7 System prototype demonstration in a space environment. In particular, regarding software, TRL 7 indicates prototype software is fully integrated with operational hardware/software systems demonstrating operational feasibility.

E.8 TRL 8 Actual system completed and flight qualified through test and demonstration (ground or space). In particular, regarding software, TRL 8 indicates the final product in its final configuration is successfully demonstrated through test and analysis for its intended operational environment and platform (ground, airborne, or space.)

E.9 TRL 9 Actual system flight proven through successful mission opportunities. In particular, regarding software, TRL 9 indicates that the final product is successfully operated in an actual mission.

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